THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Esmaell Yousefi
Serial No.	:	09/599,036
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For	:	BEAM LAYDOWN FOR HOPPED SATELLITE DOWNLINK WITH ADAPTABLE DUTY CYCLE
Group Art Unit	:	2617
Examiner	:	Nghi H. Ly
Attorney Docket No.	:	NG(ST)8104

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APPEAL BRIEF

Sir:

Pursuant to the Notice of Appeal filed in this case on June 26, 2007, Appellants present herewith their Brief on appeal.

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II. **REAL PARTY IN INTEREST**

The real party in interest is Northrop Grumman Corporation.

III. RELATED APPEAL AND INTERFERENCES

There are no related appeals, interferences, or judicial procedures under 37 C.F.R. §41.37(1)(c)(ii).

IV. STATUS OF CLAIMS

Claims 10, 11, 22, and 26-28, which are attached in Section X. Claims Appendix, beginning on page 26, are currently pending in this application. Claims 10, 11, and 22 are allowed. Claims 26-28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,275,518 to Takahashi, et al. ("Takahashi") in view of U.S. Patent No. 6,522,643 to Jacomb-Hood, et al. ("Jacomb-Hood"). Claims 1-9, 12-21, and 23-25 are cancelled.

Claims 26-28 are currently under appeal.

V. STATUS OF AMENDMENTS

A Final Office Action was submitted on May 14, 2007. No amendments have been entered since the submission of the Final Office Action dated May 14, 2007.

VI. SUMMARY OF THE CLAIMED SUBJECT MATTER

One aspect of the present invention, as recited in claim 26, provides a system for generating a variable hop cycle beam laydown (FIG. 7, 700). First cells (FIG. 7, C, D) are supported by a first beam hop cycle associated with a first downlink beam (Page 22, Table 1; Page 23, ll. 11-12). Second cells (FIG. 7, G, H) are supported by a second beam hop cycle associated with a second downlink beam, the second beam hop cycle being different than the first beam hop cycle (Page 22, Table 1; Page 23, ll. 13-14). Transition cells (FIG. 7, E, F) are supported by a transition beam hop cycle (Page 22, Table 1; Page 24, ll. 1-7). The transition beam hop cycle comprises transition downlink beam energy transmitted to a first transition cell (FIG. 7, E) a first percent of a time period, the transition downlink beam energy transmitted to a second transition cell (FIG. 7, F) a second percent of the time period, and a power gated downlink beam associated with at least one of the first transition cell (FIG. 7, E) and the second transition cell (FIG. 7, F) for a remaining percent of the time period (Page 22, Table 1; line 3 through Page 24, line 12; Page 13, ll. 8-16). The first downlink beam is provided to one of the first cells (FIG. 7, D) that is adjacent to the first transition cell (FIG. 7, E) during one of the second percent of the time period and the remaining percent of the time period (Page 23, line 11 through Page 24, line 12). The second downlink beam is provided to one of the second cells (FIG. 7, G) that is adjacent to the second transition cell (FIG. 7, F) during one of the first percent of the time period and the remaining percent of the time period (Page 23, line 13 through Page 24, line 12).

Another aspect of the invention, as recited in claim 27, provides an apparatus for generating a variable hop cycle beam laydown (FIG. 7, 700). A waveform generator (FIG. 1, 106) produces a first downlink beam, second downlink beam, and a transition downlink beam. At least one switch (FIG. 1, 110) directs the first downlink beam between first feed paths (FIG. 1, 112, 114) to first cells (FIG. 7, C, D; Page 10, line 19 through Page 11, line 15), directs the second downlink beam between second feed paths (FIG. 1, 112, 114) to second cells (FIG. 7, G, H; Page 10, line 19 through Page 11, line 15), and directs the transition downlink beam between third feed paths (FIG. 1, 112, 114) to transition cells (FIG. 7, E, F; Page 10, line 19 through Page 11, line 15). At least one feed path selection input (FIG. 2, 222) is coupled to the at least one switch (FIG. 2, 110). A memory (FIG. 2, 202) stores downlink beam type definitions (Page 24, Table 2) that direct the feed path selection input (FIG. 2, 222) to control the switch (FIG. 2, 110) according to a first beam hop cycle, a second beam hop cycle different than the first beam hop cycle, and a transition beam hop cycle (Page 22, Table 1; Page 23, line 11 through Page 24, line 7). The transition beam hop cycle specifies transmission of downlink beam energy of the transition downlink beam to a first transition cell (FIG. 7, E) a first percent of the time period, specifies the downlink beam energy of the transition downlink beam to a second transition cell (FIG. 7, E) a second percent of the time period, and specifies a power gated downlink transition beam associated with at least one of the first transition cell (FIG. 7, E) and the second transition cell (FIG. 7, F) a remaining percent of the time period (Page 22, Table 1; line 3 through Page 24, line 12; Page 13, ll. 8-16). As such, the first downlink beam is provided to one of the first cells (FIG. 7, D) that is adjacent to the first transition cell (FIG. 7, E) during one of the second percent

of the time period and the remaining percent of the time period (Page 23, line 11 through Page 24, line 12), and the second downlink beam is provided to one of the second cells (FIG. 7, G) that is adjacent to the second transition cell (FIG. 7, F) during one of the first percent of the time period and the remaining percent of the time period (Page 23, line 13 through Page 24, line 12). A power gating circuit (FIG. 3, 302, 304, 306, 316) is coupled to the waveform generator (FIG. 2, 206) for gating power in the transition downlink beam (Page 13, ll. 8-16; Page 12, line 13 through Page 13, line 2).

Another aspect of the invention, as recited in claim 28, provides a method for providing a variable beam hop cycle beam laydown (FIG. 7, 700). First downlink beam energy is transmitted for first cells (FIG. 7, C, D) according to a first beam hop cycle (Page 22, Table 1; Page 23, ll. 11-12). Second downlink beam energy is transmitted for second cells (FIG. 7, G, H) according to a second beam hop cycle different from the first beam hop cycle (Page 22, Table 1; Page 23, ll. 13-14). Transition downlink beam energy is transmitted for transition cells (FIG. 7, E, F) according to a transition beam hop cycle (Page 22, Table 1; Page 24, ll. 1-7). The transition beam hop cycle comprises transition downlink beam energy transmitted to a first transition cell (FIG. 7, E) a first percent of a time period, the transition downlink beam energy transmitted to a second transition cell (FIG. 7, F) a second percent of the time period, and a power gated downlink beam associated with at least one of the first transition cell (FIG. 7, E) and the second transition cell (FIG. 7, F) for a remaining percent of the time period (Page 23, line 11 through Page 24, line 12). Each of the first beam hop cycle, the second beam hop cycle, and the transition beam hop cycle define how the respective downlink beam energy of a given beam is

time shared between at least two cells of the respective first cells, second cells, and transition cells (Page 22, Table 1). As such, a first downlink beam is provided to one of the first cells (FIG. 7, D) that is adjacent to a first transition cell (FIG. 7, E) during one of the second percent of the time period and the remaining percent of the time period, and the second downlink beam is provided to one of the second cells (FIG. 7, G) that is adjacent to the second transition cell (FIG. 7, F) during one of the first percent of the time period and the remaining percent of the time period (Page 23, line 13 through Page 24, line 12).

VII. GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

Whether claims 26-28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,275,518 to Takahashi, et al. ("Takahashi") in view of U.S. Patent No. 6,522,643 to Jacomb-Hood, et al. ("Jacomb-Hood").

VIII. ARGUMENTS FOR CLAIMS 26-28

1. 35 U.S.C. §103(a) rejection of claims 26-28 as being unpatentable over Takahashi in view of Jacomb-Hood.

The Court of Customs and Patent Appeals has held that, "to establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." *In re Royka*, 490 F. 2d 981, 180 USPQ 580 (CCPA 1974).

i. The combination of Takahashi and Jacomb-Hood does not teach or suggest the recitations of claim 26.

Claim 26 is patentable over Takahashi in view of Jacomb-Hood because neither Takahashi nor Jacomb-Hood, individually or in combination, teaches or suggests a system for generating a variable hop cycle beam laydown comprising first cells supported by a first beam hop cycle associated with a first downlink beam, second cells supported by a second beam hop cycle associated with a second downlink beam, the second beam hop cycle being different than the first beam hop cycle, and transition cells supported by a transition beam hop cycle, as recited in claim 26. Claim 26 is further patentable over Takahashi in view of Jacomb-Hood because neither Takahashi nor Jacomb-Hood, individually or in combination, teaches or suggests that the transition beam hop cycle comprises transition downlink beam energy transmitted to a first transition cell during a first percent of a time period, the transition downlink beam energy transmitted to a second transition cell during a second percent of the time period and a power gated downlink beam transmitted to at least one of the first transition cell and the second transition cell for the remaining percent of the time period, as also recited in claim 26.

In the Final Office Action dated March 23, 2007 (hereinafter "Final Office Action"), in rejecting claim 26, the Examiner relies on Takahashi to teach first cells supported by a first beam hop cycle associated with a first downlink beam, second cells supported by a second beam hop cycle associated with a second downlink beam, the second beam hop cycle being different than the first beam hop cycle, and transition cells supported by a transition beam hop cycle, as recited in claim 26 (Final Office Action, pages 4-5). Takahashi discloses a frequency hopping communication system, such that a plurality of predetermined radio frequencies are hopped at regular time intervals, the hopping pattern defining an order of radio frequencies on a given cell (see, *e.g.*, Takahashi, col. 3, ll. 50-57). In the rejection of claim 26, the Examiner concedes through his own admission that Takahashi discloses a frequency hopping scheme by stating that "Takahashi teaches '*frequency hopping in different cell**s***' and '*a plurality of predetermined radio frequencies are hoped* [sic] *at regular time intervals*,'" (Final Office Action, page 4; citing Takahashi, Abstract and col. 3, ll. 50-64; emphasis in the original). Therefore, Representative for Applicant respectfully submits that the Examiner fails to appreciate the fundamental distinction between frequency hopping, as taught by Takahashi, and beam hopping, as described in the Present Application and recited in claim 26.

As is known in the art, beam hopping describes a system where a given transmitted beam is hopped between multiple cells from a satellite. The hopping between the multiple cells can occur through switching the given beam between signal paths at the satellite transmitter. As an example, the Present Application describes structure that accomplishes such beam hopping in that "[a] first feed path and [a] second feed path may, for example, connect to individual antenna

feed horns to direct spot beam coverage to distinct terrestrial cells," (Present Application, page 7, ll. 6-9). In contrast, as is known in the art, frequency hopping is a system in which a given transmission is hopped between different frequencies. Specifically, Takahashi describes a system in which frequencies are hopped within an individual cell for communications between a base station and radio stations in a ground-based radio LAN (see Takahashi, *e.g.*, FIG. 1). The base stations taught by Takahashi are ground-based transmitters based on being connected to a wired LAN and each servicing a radio cell having a fixed coverage area (Takahashi, col. 7, ll. 1-35). Thus, each of the base stations transmits within the respective coverage area of the radio cell, and thus hops frequencies within the cell to allow receivers located in an area of overlap between two adjacent cells to differentiate communications between the two cells (Takahashi, col. 7, ll. 19-35).

The differences between frequency hopping, as taught by Takahashi, and beam hopping, as described in the Present Application and recited in claim 26, are thus readily apparent. A given base station, as taught by Takahashi, is a land based transmitter that communicates to receivers within the single cell that is defined by the fixed coverage area. The given base station, as taught by Takahashi, hops between a predetermined sequence of frequencies within the single cell (see, *e.g.*, Takahashi, col. 3, ll. 50-64; cited by the Examiner). In contrast, in a beam hopping system such as described in the Present Application and recited in claim 26, a given beam is hopped between multiple cells. Therefore, Representative for Applicant respectfully submits that the Examiner's emphasis on "cell<u>**s**</u>" in the rejection of claim 26 to demonstrate a teaching of a beam hop cycle of first cells, second cells, and transition cells, as recited in claim

26, is misplaced. Multiple cells are fundamental for frequency hopping, as each adjacent cell hops frequencies so as to avoid interference with each other caused by transmitting the same frequency (see Takahashi, *e.g.*, col. 4, ll. 41-67). However, the frequency hopping scheme of Takahashi, as described above, is specific to a given one cell, with the frequencies being hopped within the given one cell as defined by the coverage area. However, as recited in claim 26, the first beam hop cycle, the second beam hop cycle, and the transition hop cycle each support a plurality of cells (*i.e.*, the first cells, the second cells, and the transition cells, respectively), and not just a single cell.

Even assuming *arguendo* that beam hop cycles, as recited in claim 26, can be considered as taught by Takahashi, the Examiner asserts that Takahashi inherently teaches transition cells supported by a transition hop cycle without providing any support in the teachings of Takahashi for such an assertion or any distinction between transition cells and the first and second cells, as distinguishable in claim 26 (see Final Office Action, page 5). Furthermore, as described above, the frequency hopping scheme of Takahashi is directed to communications between a base station and radio stations in a cell. Such communications, however, cannot be considered a "beam" hop cycle, as a "beam" inherently refers to a directed communications, whereas the communications between the base station and the radio stations in Takahashi is omnidirectional to define the coverage area (see Takahashi, *e.g.*, FIGS. 1, 3, and 14).

In the Advisory Action dated June 12, 2007 (hereinafter "Advisory Action"), the Examiner responds to the above arguments by merely restating the rejection of claim 26 provided in the Final Office Action (see Advisory Action, page 2). However, the Examiner's

restatement of the rejection of claim 26 is insufficient to adequately support the Examiner's assertion of the teachings of Takahashi with regard to claim 26. Therefore, Representative for Applicant respectfully submits that Takahashi does not teach or suggest first cells supported by a first beam hop cycle associated with a first downlink beam, second cells supported by a second beam hop cycle associated with a second downlink beam, the second downlink beam being different than the first beam hop cycle, and transition cells supported by a transition beam hop cycle, as recited in claim 26.

The Examiner concedes that Takahashi does not teach or suggest that the transition beam hop cycle comprises transition downlink beam energy transmitted to a first transition cell during a first percent of a time period, the transition downlink beam energy transmitted to a second transition cell during a second percent of the time period and a power gated downlink beam transmitted to at least one of the first transition cell and the second transition cell for the remaining percent of the time period, as recited in claim 26 (Final Office Action, page 5). The Examiner relies on Jacomb-Hood to teach these elements of claim 26 based on a beam-hopping scheme between a satellite and a plurality of cells (Final Office Action, pages 5-6; citing Jacomb-Hood, FIG. 1; Abstract; col. 1, ll. 33-44; col. 2, ll. 14-19).

Jacomb-Hood discloses a beam-hopping cellular communication system in which communication resources are assigned based on a traffic estimate for each cell and a number of available beams (Jacomb-Hood, Abstract). The communication resources, as described by Jacomb-Hood, are based on a dwell time that is calculated and assigned to each cell (Jacomb-

Hood, Abstract). FIG. 3 of Jacomb-Hood demonstrates a sequential allocation of time slots for cells for each beam.

In contrast to the recitations of claim 26, Jacomb-Hood provides no teaching or suggestion as to a locational relationship between cells. Specifically, claim 26 recites that transitional cells are located adjacent to first cells and second cells. Jacomb-Hood merely states that the time slot allocations are provided to the cells, with each cell being referred to only by a number (see, *e.g.*, Jacomb-Hood, FIG. 3; col. 4, ll. 27-42). There is no indication in Jacomb-Hood that specific cells within a given transmission sequence are adjacent relative to each other. In the Advisory Action, the Examiner asserts that "Jacomb-Hood does indeed teach transitional cells that are located adjacent to the first cells and the second cells since Jacomb-Hood teaches a plurality of cells and any cell that is between two cells is a transitional cell," (Advisory Action, page 4). However, the Examiner's assertion is not appreciative of the specific language of claim 26, in that a first of the transitional cells having a transition beam hop cycle is adjacent to one of the first cells having a first hop cycle associated with a first downlink beam and that a second of the transitional cells is adjacent to one of the second cells having a second hop cycle associated with a second downlink beam, as recited in claim 26. The Examiner's assertion is also not appreciative of the times at which the adjacent cells receive the downlink beam energy, as described below.

Jacomb-Hood also provides no teaching or suggestion as to a temporal relationship between groups of cells and transitional cells with regard to the downlink beams recited in claim 26. Specifically, claim 26 recites a first percent of a time period during which a first transition

cell and one of the second cells receive downlink beam energy, a second percent of the time period during which a second transition cell and one of the first cells receive downlink beam energy, and a remaining percent of the time period during which one of the transition cells and either a first cell or a second cell receive downlink beam energy concurrently. Therefore, claim 26 describes that a cell and a non-adjacent transition cell are each provided downlink beam energy for an equal amount of time. Contrary to claim 26, Jacomb-Hood teaches that each cell is independently assigned a dwell time that corresponds to a time that it receives downlink beam energy (Jacomb-Hood, col. 6, ll. 2-7). Therefore, Jacomb-Hood merely discloses a beam-hop cycle for cells with an unspecified relationship of location and time of receiving downlink beam energy relative to each other, and thus does not teach or suggest the locational and temporal relationships of the cells relative to each other, as described in claim 26.

Furthermore, the rejection of claim 26 in the Final Office Action does not specifically address the claim element of a power gated downlink beam (see Final Office Action, pages 5-6). Power gating of the downlink beam, as recited in claim 26, is described in the Specification of the Present Application. Specifically, a power gated signal is a signal that is ordinarily fully upconverted for amplification and transmission, but is provided no energy (Present Application, page 13, ll. 8-13). Therefore, no amplification energy is expended, resulting in substantially no downlink energy (Present Application, page 13, ll. 13-16). The Court of Appeals of the Federal Circuit has decided that "[w]here an explicit definition is provided by the applicant for a term, that definition will control interpretation of the term as it is used in the claim." *Toro Co. v. White Consolidated Industries Inc.*, 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999)

(meaning of words used in a claim is not construed in a "lexicographic vacuum, but in the context of the specification and drawings"). Representative for Applicant therefore respectfully submits that Jacomb-Hood does not describe a power gated downlink beam, as described in the Specification of the Present Application. Accordingly, Jacomb-Hood does not teach or suggest providing a power gated downlink beam to at least one of a first transition cell and a second transition cell for a remaining percent of the time period, as recited in claim 26.

Therefore, for all of the above reasons, Jacomb-Hood does not teach or suggest transition beam hop cycle comprises transition downlink beam energy transmitted to a first transition cell a first percent of a time period, the transition downlink beam energy transmitted to a second transition cell a second percent of the time period, and a power gated downlink beam associated with at least one of the first transition cell and the second transition cell for a remaining percent of the time period, as recited in claim 26. Jacomb-Hood further does not teach or suggest that the first downlink beam is provided to one of the first cells that is adjacent to the first transition cell during one of the second percent of the time period and the remaining percent of the time period, and that the second downlink beam is provided to one of the second cells that is adjacent to the second transition cell during one of the first percent of the time period and the remaining percent of the time period, as also recited in claim 26.

In addition to the failure of both Takahashi and Jacomb-Hood to teach or suggest claim 26, as asserted in the Final Office Action, Representative for Applicant respectfully submits that there is no motivation for one of ordinary skill in the art to combine the teachings of Takahashi and Jacomb-Hood to achieve the combination of elements of claim 26. Representative for

Applicant also respectfully submits that the motivation provided by the Examiner in the Final Office Action is deficient, as it disregards the conflicting subject matter of Takahashi and Jacomb-Hood (see Final Office Action, page 6).

As described above, the disclosure of Takahashi is directed to a radio LAN in which a base station in each cell hops frequencies so as to avoid interference with a base station in an adjacent cell caused by transmitting the same frequency (see Takahashi, *e.g.*, col. 4, ll. 41-67). Also as described above, the disclosure of Jacomb-Hood is directed to a satellite beam-hopping cellular communication system in which time slots for cells are allocated for each beam, the time slots being allocated based on inter-beam interference (Jacomb-Hood, col. 1, ll. 33-43). Therefore, Takahashi and Jacomb-Hood each disclose fundamentally different communication concepts: a radio LAN and a satellite system, respectively. Specifically, one of ordinary skill in the art would not be motivated to combine a terrestrial-based radio LAN with a satellite beam-hopping system since a base station, such as disclosed by Takahashi, is incapable of hopping beams to separate cells, such as disclosed by Jacomb-Hood. In addition, the frequency hopping scheme taught by Takahashi and the beam-hopping scheme taught Jacomb-Hood are each separate transmission schemes that are implemented to achieve the same goal: non-interference of communications in adjacent cells. Therefore, one of ordinary skill in the art would not be motivated to implement both of the separate and distinct transmission schemes of frequency hopping and beam hopping in the same system, as such a combination would be redundant and would result in needless additional complexity and cost. Accordingly, for these reasons, there is

no motivation for one of ordinary skill in the art to combine the teachings of Takahashi and Jacomb-Hood to teach or suggest claim 26.

For all of the reasons stated above, it is therefore respectfully submitted that neither Takahashi nor Jacomb-Hood, individually or in combination, make obvious claim 26.

ii. The combination of Takahashi and Jacomb-Hood does not teach or suggest the recitations of claim 27.

Representative for Applicant respectfully submits that, for the reasons described above regarding claim 26, the combination of Takahashi and Jacomb-Hood does not teach or suggest an apparatus for generating a variable hop cycle beam laydown comprising a memory for storing downlink beam type definitions that direct the feed path selection input to control the switch according to a first beam hop cycle, a second beam hop cycle different than the first beam hop cycle, and a transition beam hop cycle, as recited in claim 27. Likewise, for substantially the same reasons described above regarding claim 26, the combination of Takahashi and Jacomb-Hood does not teach or suggest that the transition beam hop cycle specifies transmission of downlink beam energy of the transition downlink beam to a first transition cell a first percent of the time period, specifies the downlink beam energy of the transition downlink beam to a second transition cell a second percent of the time period, and specifies a power gated downlink transition beam associated with at least one of the first transition cell and the second transition cell a remaining percent of the time period, as also recited in claim 27. In addition, for substantially the same reasons described above regarding claim 26, the combination of

Takahashi and Jacomb-Hood does not teach or suggest that the first downlink beam is provided to one of the first cells that is adjacent to the first transition cell during one of the second percent of the time period and the remaining percent of the time period, and such that the second downlink beam is provided to one of the second cells that is adjacent to the second transition cell during one of the first percent of the time period and the remaining percent of the time period, as recited in claim 27.

Furthermore, Representative for Applicant respectfully submits that the combination of Takahashi and Jacomb-Hood does not teach or suggest a power gating circuit coupled to the waveform generator for gating power in the transition downlink beam, as recited in claim 27. In the Advisory Action, the Examiner asserts that Jacomb-Hood inherently teaches this element of claim 27 based on a citation of the Abstract of Jacomb-Hood. Specifically, Jacomb-Hood describes the following:

> An apparatus, method, and computer program product for assigning communication resources in a beam-hopping cellular communication system. The satellite has a multiple beam antenna that covers a number of cells that is greater than the number of available beams. In a preferred embodiment, the method includes the steps of selecting a frequency for each beam, computing a dwell time for each cell based on the traffic estimates for each cell and the number of available beams, and selecting a cell hopping sequence for each beam based on the dwell times and predicted inter-beam interference. (Jacomb-Hood, Abstract).

As described above, power gating refers to providing no energy to a signal that is ordinarily fully upconverted for amplification and transmission, such that no amplification energy is expended, thus resulting in substantially no downlink energy (Present Application, page 13, ll. 8-16). In

contrast, the cited portion of Jacomb-Hood merely describes a manner in which a multiple beam antenna assigns beams to cells in a cell hopping sequence. Therefore, neither the cited portion nor any other portion of Jacomb-Hood describes in any way a power gating circuit that gates power in a transition downlink beam, as recited in claim 27. The Examiner provides no basis or description for how the cited portion, or any other portion, of Jacomb-Hood inherently teaches power gating a downlink signal, as described in the Present Application and recited in claim 27. Accordingly, the combination of Takahashi and Jacomb-Hood does not teach or suggest a power gating circuit coupled to the waveform generator for gating power in the transition downlink beam, as recited in claim 27.

For all of the reasons stated above, it is therefore respectfully submitted that neither Takahashi nor Jacomb-Hood, individually or in combination, make obvious claim 27.

iii. The combination of Takahashi and Jacomb-Hood does not teach or suggest the recitations of claim 28.

Representative for Applicant respectfully submits that, for the reasons described above regarding claim 26, the combination of Takahashi and Jacomb-Hood does not teach or suggest transmitting first downlink beam energy for first cells according to a first beam hop cycle, transmitting second downlink beam energy for second cells according to a second beam hop cycle different from the first beam hop cycle, and transmitting transition downlink beam energy for transition cells according to a transition beam hop cycle, as recited in claim 28. Likewise, for substantially the same reasons described above regarding claim 26, the combination of

Takahashi and Jacomb-Hood does not teach or suggest that the transition beam hop cycle comprises transition downlink beam energy transmitted to a first transition cell a first percent of a time period, the transition downlink beam energy transmitted to a second transition cell a second percent of the time period, and a power gated downlink beam associated with at least one of the first transition cell and the second transition cell for a remaining percent of the time period, as also recited in claim 28. Furthermore, for substantially the same reasons described above regarding claim 26, the combination of Takahashi and Jacomb-Hood does not teach or suggest that each of the first beam hop cycle, the second beam hop cycle, and the transition beam hop cycle define how the respective downlink beam energy of a given beam is time shared between at least two cells of the respective first cells, second cells, and transition cells, such that a first downlink beam is provided to one of the first cells that is adjacent to a first transition cell during one of the second percent of the time period and the remaining percent of the time period, and such that the second downlink beam is provided to one of the second cells that is adjacent to the second transition cell during one of the first percent of the time period and the remaining percent of the time period, as recited in claim 28.

For all of the reasons stated above, it is therefore respectfully submitted that neither Takahashi nor Jacomb-Hood, individually or in combination, make obvious claim 28.

IX. CONCLUSION AND SIGNATURE

Please charge any deficiency or credit any overpayment in the fees for this Appeal Brief to Deposit Account No. 20-0090.

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X. CLAIMS APPENDIX

10. A variable beam hop cycle beam laydown comprising:

first cells supported by a first beam hop cycle;

second cells supported by a second beam hop cycle different from the first beam hop cycle; and

transition cells supported by a transition beam hop cycle for transitioning between the first beam hop cycle and the second beam hop cycle;

wherein each beam hop cycle defines how the downlink energy of one beam is time-shared between at least two cells and wherein each of the hop cycles defines a schedule for transmitting beam energy to at least two cells in a sequential and non-simultaneous manner;

wherein the first cells comprise a first beam-hopped pair of cells, the second cells comprise a second beam-hopped pair of cells, and the transition cells comprise a third beam-hopped pair of cells;

wherein the first beam hop cycle is a 50-50 beam hop cycle wherein beam energy is directed to two cells sequentially on a 50-50 duty cycle basis; and

wherein the second beam hop cycle is a 75-25 beam hop cycle in which beam energy is directed to two cells sequentially on a 75-25 duty cycle basis, and wherein the transition beam hop cycle is a 50-25 beam hop cycle in which beam energy is directed to two cells sequentially on a 50-25 duty cycle basis and is powered off for a remaining 25% of the duty cycle.

11. The laydown of claim 10, wherein the 50-25 beam hop cycle directs downlink beam energy to a first transition cell 50 percent of a time period, downlink beam energy to a second transition cell 25 percent of the time period, and a power gated downlink beam 25 percent of the time period.

22. Apparatus for generating a variable hop cycle beam laydown, the apparatus comprising:

a waveform generator producing a first downlink beam, second downlink beam, and a transition downlink beam;

at least one switch directing the first downlink beam between first feed paths to first cells, directing the second downlink beam between second feed paths to second cells, and directing the transition downlink beam between third feed paths to transition cells;

at least one feed path selection input coupled to the at least one switch; and a memory for storing downlink beam type definitions that direct the feed path selection input to control the switch according to a first beam hop cycle, a second beam hop cycle different from the first beam hop cycle, and a transition beam hop cycle;

wherein each beam hop cycle defines how one downlink beam is time-shared between at least two cells and wherein operation of the at least one switch ensures that each downlink beam is directed to at least two cells in a sequential and non-simultaneous manner;

wherein the first beam hop cycle directs additional bandwidth to one of the first cells to meet bandwidth need;

wherein the first beam hop cycle is a 75-25 beam hop cycle in which beam energy is divided temporally between two cells on a 75-25 duty cycle basis; and

wherein the second beam hop cycle is a 50-50 beam hop cycle in which beam energy is divided temporally between two cells on a 50-50 duty cycle basis, and wherein the transition beam hop cycle is a 50-25 beam hop cycle in which beam energy is directed to two cells sequentially on a 50-25 duty cycle basis and is powered off for a remaining 25% of the duty cycle.

26. A system for generating a variable hop cycle beam laydown comprising:

first cells supported by a first beam hop cycle associated with a first downlink beam;

second cells supported by a second beam hop cycle associated with a second downlink beam, the second beam hop cycle being different than the first beam hop cycle; and

transition cells supported by a transition beam hop cycle,

wherein said transition beam hop cycle comprises transition downlink beam energy transmitted to a first transition cell a first percent of a time period, the transition downlink beam energy transmitted to a second transition cell a second percent of the time period, and a power gated downlink beam associated with at least one of the first transition cell and the second transition cell for a remaining percent of the time period, such that the first downlink beam is provided to one of the first cells that is adjacent to the first transition cell during one of the second percent of the time period and the remaining percent of the time period, and such that the second downlink beam is provided to one of the second cells that is adjacent to the second

transition cell during one of the first percent of the time period and the remaining percent of the time period.

27. Apparatus for generating a variable hop cycle beam laydown, the apparatus comprising:

a waveform generator producing a first downlink beam, second downlink beam, and a transition downlink beam;

at least one switch directing the first downlink beam between first feed paths to first cells, directing the second downlink beam between second feed paths to second cells, and directing the transition downlink beam between third feed paths to transition cells;

at least one feed path selection input coupled to the at least one switch;

a memory for storing downlink beam type definitions that direct the feed path selection input to control the switch according to a first beam hop cycle, a second beam hop cycle different than the first beam hop cycle, and a transition beam hop cycle,

wherein the transition beam hop cycle specifies transmission of downlink beam energy of the transition downlink beam to a first transition cell a first percent of the time period, specifies the downlink beam energy of the transition downlink beam to a second transition cell a second percent of the time period, and specifies a power gated downlink transition beam associated with at least one of the first transition cell and the second transition cell a remaining percent of the time period, such that the first downlink beam is provided to one of the first cells that is adjacent to the first transition cell during one of the second percent of the time period and the remaining percent of the time period, and such that the second downlink beam is provided to one of the

second cells that is adjacent to the second transition cell during one of the first percent of the time period and the remaining percent of the time period; and

a power gating circuit coupled to the waveform generator for gating power in the transition downlink beam.

28. A method for providing a variable beam hop cycle beam laydown, the method comprising:

transmitting first downlink beam energy for first cells according to a first beam hop cycle;

transmitting second downlink beam energy for second cells according to a second beam hop cycle different from the first beam hop cycle; and

transmitting transition downlink beam energy for transition cells according to a transition beam hop cycle, the transition beam hop cycle comprises transition downlink beam energy transmitted to a first transition cell a first percent of a time period, the transition downlink beam energy transmitted to a second transition cell a second percent of the time period, and a power gated downlink beam associated with at least one of the first transition cell and the second transition cell for a remaining percent of the time period;

wherein each of the first beam hop cycle, the second beam hop cycle, and the transition beam hop cycle define how the respective downlink beam energy of a given beam is time shared between at least two cells of the respective first cells, second cells, and transition cells, such that a first downlink beam is provided to one of the first cells that is adjacent to a first transition cell

during one of the second percent of the time period and the remaining percent of the time period, and such that the second downlink beam is provided to one of the second cells that is adjacent to the second transition cell during one of the first percent of the time period and the remaining percent of the time period.

XI. EVIDENCE APPENDIX

There was no evidence relied upon in this brief that was submitted under 37 C.F.R. §§1.130-1.132, or otherwise submitted and entered into the record by the Examiner.

XII. RELATED PROCEEDINGS APPENDIX

There are no related appeals, interferences, or judicial procedures under 37 C.F.R. §41.37(1)(c)(ii).